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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/802,924	03/18/2004	Robert E. Miller III	H2160-00002	5420

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EXAMINER

MONIKANG, GEORGE C

ART UNIT PAPER NUMBER

2615

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/802,924

Applicant(s)

MILLER, ROBERT E.

Examiner

George C. Monikang

Art Unit

2615

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply, and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 March 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-64 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7, 14-16, 20-24, 31-38, 45-47, 51-55 and 62-64 is/are rejected.
- 7) ☒ Claim(s) 8-13, 17-19, 25-30, 39-44, 48-50 and 56-61 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>6/21/2004</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 1-7, 14-15, 20-24, 31-38, 45-46, 51-55 & 62-64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jot et al, US Patent 7,231,054 B1, in view of Ito, US Patent Pub. 2002/0172370 A1.

Re Claim 1, Jot et al discloses a system for producing an output sound field that is representative of an input sound field (abstract), comprising: a microphone signal ("P.sub.in") representative of the input sound field wherein P.sub.in comprises B-format channels (col. 8, lines 43-53), an FL (front left) channel, and an FR (front right) channel (fig. 4b: filter bank); an encoder for producing an encoded signal ("S.sub.out") from P.sub.in wherein S.sub.out comprises an ITU-compatible six channel signal (col. 12, lines 47-62); a decoder for producing a decoded signal ("P.sub.out") from S.sub.out

wherein P.sub.out comprises B-format channels, an FL channel, and an FR channel (fig. 2; fig. 11; col. 12, lines 47-62); and a plurality of speakers for producing the output sound field from P.sub.out (fig. 2; fig. 11; col. 12, lines 47-62); but fails to disclose a microphone array for receiving the input sound field and producing therefrom. However, Ito does (fig. 1).

Taking the combined teachings of Jot et al and Ito as a whole, one skilled in the art would have found it obvious to modify the system for producing an output sound field that is representative of an input sound field (abstract), comprising: a microphone signal ("P.sub.in") representative of the input sound field wherein P.sub.in comprises B-format channels (col. 8, lines 43-53), an FL (front left) channel, and an FR (front right) channel (fig. 4b: filter bank); an encoder for producing an encoded signal ("S.sub.out") from P.sub.in wherein S.sub.out comprises an ITU-compatible six channel signal (col. 12, lines 47-62); a decoder for producing a decoded signal ("P.sub.out") from S.sub.out wherein P.sub.out comprises B-format channels, an FL channel, and an FR channel (fig. 2; fig. 11; col. 12, lines 47-62); and a plurality of speakers for producing the output sound field from P.sub.out (fig. 2; fig. 11; col. 12, lines 47-62) of Jot et al with a microphone array for receiving the input sound field and producing therefrom as taught in Ito (fig. 1) so sound could be picked up from multiple directions.

Re Claim 2, the combined teachings of Jot et al and Ito disclose the system of claim 1 wherein the hybrid microphone array is comprised of: at least 6 microphones; and a baffle including a substantially ellipsoidal structure (Ito, fig. 1).

Re Claim 3, the combined teachings of Jot et al and Ito disclose the system of claim 2, but fails to disclose wherein four of said microphones are arranged in a tetrahedron.

However, arranging the microphones in a tetrahedron is the designer's preference. It would have been obvious to arrange the microphones in a tetrahedron to make the microphone array more dynamic.

Re Claim 4, the combined teachings of Jot et al and Ito disclose the system of claim 3 wherein the plurality of speakers produces the output sound field from S.sub.out (*Jot et al, fig. 11; col. 12, lines 47-62*).

Re Claim 5, the combined teachings of Jot et al and Ito disclose the system of claim 4 wherein the plurality of speakers are arranged in a 2D arrangement (*Jot et al, col. 11, lines 3-8*).

Re Claim 6, the combined teachings of Jot et al and Ito disclose the system of claim 1 wherein P.sub.in and S.sub.out are each a 6.times.1 matrix (*Jot et al, col. 9, lines 22-46*) and the encoder produces S.sub.out by multiplying P.sub.in by a 6.times.6 transformation matrix ("S") (*Jot et al, col. 9, lines 22-46*).

Re Claim 7, which further recites, "Wherein S comprises the quantities: 3 s (L , FL) s (L , FR) s (L , W) s (L , X) s (L , Y) s (L , Z) s (R , FL) s (R , FR) s (R , W) s (R , X) s (R , Y) s (R , Z) s (C , FL) s (C , FR) s (C , W) s (C , X) s (C , Y) s (C , Z) s (SC , FL) s (SC , FR) s (SC , W) s (SC , X) s (SC , Y) s (SC , Z) s (SL , FL) s (SL , FR) s (SL , W) s (SL , X) s (SL , Y) s (SL , Z) s (SR , FL) s (SR , FR) s (SR , W) s (SR , X) s (SR , Y) s (SR , Z) wherein: L represents a left

speaker channel for an ITU-compatible six channel signal, R represents a right speaker channel for an ITU-compatible six channel signal, C represents a center speaker channel for an ITU-compatible six channel signal, SC represents a surround center speaker channel for an ITU-compatible six channel signal, SL represents a surround left speaker channel for an ITU-compatible six channel signal, SR represents a surround right speaker channel for an ITU-compatible six channel signal; FL represents the front left speaker channel, FR represents the front right speaker channel; W represents a B-format channel, X represents a B-format channel, Y represents a B-format channel, Z represents a B-format channel; and wherein $s(\alpha, \beta)$ represents a transformation quantity relating the respective α and β channels." The combined teachings of Jot et al and Ito fail to disclose the above limitations as stated. Official notice is taken that both the concepts and advantages of the above limitations are well known in the art. It would have been obvious to use S comprising the quantities: $3 s(L, FL) s(L, FR) s(L, W) s(L, X) s(L, Y) s(L, Z) s(R, FL) s(R, FR) s(R, W) s(R, X) s(R, Y) s(R, Z) s(C, FL) s(C, FR) s(C, W) s(C, X) s(C, Y) s(C, Z) s(SC, FL) s(SC, FR) s(SC, W) s(SC, X) s(SC, Y) s(SC, Z) s(SL, FL) s(SL, FR) s(SL, W) s(SL, X) s(SL, Y) s(SL, Z) s(SR, FL) s(SR, FR) s(SR, W) s(SR, X) s(SR, Y) s(SR, Z)$ wherein: L represents a left speaker channel for an ITU-compatible six channel signal; R represents a right speaker channel for an ITU-compatible six channel signal; C represents a center speaker channel for an ITU-compatible six channel signal; SC represents a surround center speaker channel for an ITU-compatible six channel signal;

SL represents a surround left speaker channel for an ITU-compatible six channel signal; SR represents a surround right speaker channel for an ITU-compatible six channel signal; FL represents the front left speaker channel; FR represents the front right speaker channel; W represents a B-format channel; X represents a B-format channel; Y represents a B-format channel; Z represents a B-format channel; and wherein $s(\alpha, \beta)$ represents a transformation quantity relating the respective α and β channels since 2D/3D arranged speaker calculations are usually conducted in a matrix format and using the above notations to represent the various speakers and B-format channels are commonly used.

Re Claim 14, the combined teachings of Jot et al and Ito disclose The system of claim 6 wherein $P_{sub.out}$ is a 6×1 matrix and the decoder produces $P_{sub.out}$ by multiplying $S_{sub.out}$ by the inverse of S (Jot et al, col. 9, lines 46-54).

Re Claim 15, the combined teachings of Jot et al and Ito disclose the system of claim 1 wherein the plurality of speakers are arranged in a 3D arrangement (Jot et al, col. 9, lines 5-12).

4. Claims 20, 32 & 51 have been analyzed and rejected according to claim 1.
5. Claims 21, 33 & 52 have been analyzed and rejected according to claim 2.
6. Claims 23, 37, 54 have been analyzed and rejected according to claim 6.
7. Claims 24, 38 & 55 have been analyzed and rejected according to claim 7.
8. Claims 31, 45, 62 have been analyzed and rejected according to claim 14.
9. Claims 22, 34, 53 has been analyzed and rejected according to claim 3.
10. Claim 35 has been analyzed and rejected according to claim 4.

11. Claim 36 has been analyzed and rejected according to claim 5.
12. Claim 46 has been analyzed and rejected according to claim 15.
13. Claim 63 has been analyzed and rejected according to claims 1, 5 & 15.
14. Claim 64 has been analyzed and rejected according to claims 1-2, 5 & 15.

15. Claims 16 & 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jot et al, US Patent 7,231,054 B1 and US Patent Pub. 2002/0172370 A1, as applied to claim 15 above, and further in view of Gerzon, US Patent 5,594,800.
16. Re Claim 16, the combined teachings of Jot et al and Ito disclose the system of claim 15, but fails to disclose wherein the plurality of speakers is ten. However, Gerzon does (col. 23, line 66 through col. 24, line 1).
17. Taking the combined teachings of Jot et al and Ito as a whole, one skilled in the art would have found it obvious to modify the system of Jot et al and Ito with disclose wherein the plurality of speakers is ten as taught in Gerzon (col. 23, line 66 through col. 24, line 1) to give the system better sound ambience.
18. Claim 47 has been analyzed and rejected according to claim 16.

Allowable Subject Matter

19. Claims 8-13, 25-30, 39-44 & 56-61 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

20. The following is a statement of reasons for the indication of allowable subject matter for claims 8-13, 24-30, 38-44 & 55-61: The prior art does not teach or moderately suggest the following limitations:

Wherein S comprises the following approximate quantities: 4 .850 0 0 0 0 0 0
.850 0 0 0 0 0 0 .601 .736 0 .425 0 0 .601 - .736 0 .425 0 0 .601 - .368 .638 - .425 0 0
.601 - .368 - .638 - .425.

Limitations such as these may be useful in combination with other limitations of claim 7.

21. Claims 17-19, 48-50 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

22. The following is a statement of reasons for the indication of allowable subject matter for claims 17-19, 48-50: The prior art does not teach or moderately suggest the following limitations:

23. A first two of said speakers are positioned so that: azimuthally, one is approximately 8 degrees to the left of and the other is approximately 8 degrees to the right of the 12 o'clock position of a listener; and elevationally, both are positioned substantially on a horizontal plane that intersects the listener's ears; a second two of said speakers are positioned so that: azimuthally, one is approximately 45 degrees to the left of and the other is approximately 45 degrees to the right of the 12 o'clock position of the listener; and elevationally, both are positioned substantially on said

horizontal plane; a third two of said speakers are positioned so that: azimuthally, one is approximately 135 degrees to the left of and the other is approximately 135 degrees to the right of the 12 o'clock position of the listener; and elevationally, both are positioned substantially on said horizontal plane; a fourth two of said speakers are positioned so that: azimuthally, one is approximately 90 degrees to the left of and the other is approximately 90 degrees to the right of the 12 o'clock position of the listener; and elevationally, both are positioned above said horizontal plane; and a fifth two of said speakers are positioned so that: azimuthally, one is approximately 90 degrees to the left of and the other is approximately 90 degrees to the right of the 12 o'clock position of the listener; and elevationally, both are positioned below said horizontal plane.

Limitations such as these may be useful in combination with other limitations of claim 16.

Contact

Any inquiry concerning this communication or earlier communications from the examiner should be directed to George C. Monikang whose telephone number is 571-270-1190. The examiner can normally be reached on M-F. alt Fri. Off 7:30am-5:00pm (est).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chin Vivian can be reached on 571-272-7848. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.


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2/1/2008


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